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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ZE'EV RUSSAK¹

Appeal 2017-002629 Application 13/985,314 Technology Center 1600

Before CHRISTOPHER G. PAULRAJ, TAWEN CHANG, and RYAN H. FLAX, *Administrative Patent Judges*.

CHANG, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134(a) involving claims to an apparatus and method for identifying transition points in a chemical reaction, which have been rejected as being directed to non-statutory subject matter. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

STATEMENT OF THE CASE

According to the Specification, "[t]he present invention relates to analyzing, monitoring and controlling chemical reactions and, more particularly, but not exclusively to systems and method for identifying

¹ Appellant identifies the Real Party in Interest as Azure Vault Ltd. (Appeal Br. 4.)

specific points in chemical reactions, such as a point in a chemical reaction, in which a new stage of the chemical reaction begins." (Spec. 1:4–7.)

Claims 1–10, 12–13, 21–30, 32, and 33 are on appeal.² Claims 1 and 21 are illustrative and reproduced below:

1. An apparatus for identifying transition points in a chemical reaction, the apparatus comprising:

an electronic computing device comprising:

a property value receiver, implemented on said electronic computing device, configured to receive a plurality of values of a physical property of the chemical reaction;

a function calculator, associated with said property value receiver, configured to calculate a linear function parallel to and different from a linear function connecting two of the received values, the two values pertaining to a start and end of a time period;

a difference calculator, associated with said function calculator, configured to calculate a difference between the calculated function and a plurality of the received values pertaining to the time period having said start and end; and

a transition point identifier, associated with said difference calculator, configured to identify at least one transition point of the chemical reaction, using the calculated difference, thereby proving for at least one of a group consisting of controlling the reaction, monitoring the reaction, and analyzing the reaction.

- 21. A computer implemented method for identifying transition points in a chemical reaction, the method comprising steps the computer is programmed to perform, the steps comprising:
- a) receiving a plurality of values of a physical property of the chemical reaction;
- b) calculating a linear function parallel to and different from a linear function connecting two of the received values, the two values pertaining to a start and end of a time period;

² In the Answer, the Examiner withdrew the rejection of claims 11 and 31 under 35 U.S.C. § 101. (Ans. 3.) Appellant cancelled claims 14 and 15 in an amendment filed concurrently with the Appeal Brief. (Appeal Br. 4.)

- c) calculating a difference between the calculated function and a plurality of the received values pertaining to the time period having said start and end; and
- d) identifying at least one transition point of the chemical reaction, using the calculated difference, thereby proving for at least one of a group consisting of controlling the reaction, monitoring the reaction, and analyzing the reaction.

(Appeal Br. 26, 27–28.)

The Examiner rejects claims 1–10, 12–13, 21–30, 32, and 33 under 35 U.S.C. § 101 as being directed to non-statutory subject matter. (Ans. 4.)

DISCUSSION

Issue

The Examiner finds that the claims are directed to "a computational method of data analysis to identify a transitional point of chemical reaction" and an apparatus for performing such a method. (Ans. 4, 6.) The Examiner finds that the method is drawn to

receiving data, calculating function, calculating a difference between the calculated function and received values, plotting data and identifying a transition point reflecting transition point of chemical reaction. As such, the method steps are directed to processing information and converting one form of numerical representation into another. In other words, the method steps simply address the concept of gathering and combining data by reciting steps of organizing information through mathematical relationships. The gathering and combining merely employs mathematical relationships to manipulate existing information to generate additional information. These limitations set forth a judicial exception, because mathematical relationships have been characterized by the courts as abstract ideas.

(Ans. 4–5, 6–7.) The Examiner further finds that "the claims as a whole do not provide significantly more than a generic computer upon which the claimed method steps are executed," and that "there are no positive process

limitations recited in the claim for actually using the information produced by the abstract idea outside of the computer (e.g. a real-world practical application or solution to a problem)." (*Id.* at 5.)

Appellant contends that the Examiner incorrectly applied the framework set forth by the Supreme Court in *Alice Corp. Pty, Ltd. v. CLS Bnak Int'l*, 134 S.Ct. 2347 (2014) and *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66 (2012). (Appeal Br.³ 8–11.) Appellant further contends that the claims are not directed to a patent-ineligible abstract idea and that, in any event, the claims amount to significantly more than the alleged abstract idea. (*Id.* at 11–13, 14–19.)

The issue with respect to this rejection is whether the evidence of record supports the Examiner's conclusion that the claims on appeal are directed to patent-ineligible subject matter.

Analysis

In determining whether a claim is directed to patent ineligible subject matter, we apply the analytical framework set out in *Mayo* and elaborated by *Alice*:

First, we determine whether the claims at issue are directed to [laws of nature, natural phenomena, or abstract ideas]. If so, we then ask, "[w]hat else is there in the claims before us?" To answer that question, we consider the elements of each claim both individually and "as an ordered combination" to determine whether the additional elements "transform the nature of the claim" into a patent-eligible application. [The Supreme Court has] described step two of this analysis as a search for an "inventive concept"—i.e., an element or

³ Appellant filed three versions of the Appeal Brief, on September 22, 2015, December 31, 2015, and May 16, 2016, respectively. The briefs contain substantially the same arguments. Citation to the Appeal Brief in this decision refers to the brief filed on May 16, 2016.

combination of elements that is "sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself."

Alice, 134 S.Ct. at 2355 (second and fourth alternations original) (citations omitted). Having considered the claims in light of this framework, we adopt the Examiner's findings of fact and reasoning (Ans. 4–8) and agree that the claims are directed to non-statutory subject matter. We address Appellant's arguments below.

Claims 1 and 21

The Examiner Correctly Applied the Alice / Mayo Framework

Appellant first contends that the Examiner incorrectly applied the framework set forth by the Supreme Court in *Alice*, 134 S.Ct. 2347, and *Mayo*, 566 U.S. 66. (Appeal Br. 8–11.) Appellant argues that, under *Alice* and *Mayo*, as well as the Federal Circuit opinions in *DDR Holdings*, *LLC v*. *Hotels.com*, *L.P.*, 773 F.3d 1245 (Fed. Cir. 2014) and *McRO*, *Inc. v*. *Bandai Namco Games America Inc.*, 837 F.3d 1299 (Fed. Cir. 2016), "in order to be patent-ineligible, the alleged to be abstract idea has to preempt or improperly tie up the future use of the building blocks of human ingenuity." (*Id.* at 9; *see also id.* at 10–11, Reply Br. 11–13.)

We are not persuaded. "While preemption may signal patent ineligible subject matter," the Federal Circuit has explained that "the absence of complete preemption does not demonstrate patent eligibility." *Ariosa Diagnostics Inc. v. Sequenom Inc.*, 788 F.3d 1371, 1379 (Fed. Cir. 2015). Instead, "[w]here a patent's claims are deemed only to disclose

⁴ *DDR Holdings* and *McRO* do not contradict *Ariosa*. *DDR Holdings* does not hold that lack of preemption by itself renders a claim patent eligible. Instead, the Federal Circuit found that the claims at issue in that case "do not

patent ineligible subject matter under the *Mayo* framework, . . . preemption concerns are fully addressed and made moot." *Id*; *see also Parker v. Flook*, 437 U.S. 584, 586 (1978) (holding claims directed to mathematical formula to be invalid even though claims "do not . . . cover every conceivable application of the formula").

Appellant further argues that the Examiner has not provided reasoning or evidence supporting the conclusion that the claims on appeal are directed to the abstract idea of "[i]dentifying transition points in a curve reflecting a chemical reaction." (Appeal Br. 9.) In particular, Appellant argues that the Examiner has not "explained how the specific features of . . . the pending claims . . . aid in monopolizing the whole allegedly abstract idea" or "provided any reasoning or evidence as to how every single claim element of every single one of the claims and the claims as a whole, relates solely to

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merely recite the performance of some . . . practice known from the preinternet world along with the requirement to perform it on the Internet," "overcome a problem specifically arising in the realm of computer networks," and also specify manipulative steps that yield "a desired result . . . that overrides the routine and conventional sequence of events ordinarily triggered by the click of a hyperlink." DDR Holdings, 773 F.3d at 1257–59. Likewise, while McRO discussed lack of preemption in determining that the claims at issue in that case were not directed to an abstract idea, McRO also acknowledged that lack of complete preemption does not demonstrate patent eligibility. McRO, 837 F.3d at 1315–16. Appellant further cites Cyberfone for the proposition that the Alice / Mayo analysis requires determining whether "additional substantive limitations . . . narrow, confine, or otherwise tie down the claim so that, in practical terms, it does not cover the full abstract idea itself." Cyberfone Sys., LLC v. CNN Interactive Group, Inc., 558 Fed.Appx. 988 (Fed. Cir. 2014) (unpublished) (citations omitted). However, the Federal Circuit in fact found the claims at issue in *Cyberfone* to be directed to non-patentable subject matter, despite patentee's argument that the claims are limited by the requirement of a specific machine (i.e., the telephone).

the alleged abstract idea (or to any other <u>known</u> concept / abstract idea)" and "to <u>the building blocks of human ingenuity</u>." (*Id.*; see also id. at 10–11.)

These arguments are similarly unpersuasive. We have explained above that a claim may be directed to non-statutory subject matter even if there is no complete preemption. *Ariosa*, 788 F.3d at 1376. Neither does case law support Appellant's apparent contention that *every single element* of the claim as well as the claim as a whole must be directed *solely* to an abstract idea in order for the claim to be patent ineligible. If this were the case, there would be no need for the second step of the *Alice / Mayo* analysis, which seeks to determine, e.g., whether a claim does significantly more than simply describe a patent-ineligible natural law. *Mayo*, 566 U.S. at 77. Instead, the first step of the *Alice / Mayo* test merely requires that "the claims [be] considered in their entirety to ascertain whether their character as a whole is directed to excluded subject matter." *McRO*, 837 F.3d at 1312 (quotation marks and citation omitted).

As discussed above, the Examiner bases the § 101 rejection on an analysis of the steps of the claims, which he finds to be "drawn to receiving data, calculating function, calculating a difference between the calculated function and received values, plotting data and identifying a transition point reflecting transition point of chemical reaction." (Ans. 4.) The Examiner explains that the claims are thus directed to patent ineligible subject matter, because "mathematical relationships have been characterized by the courts as abstract ideas." (*Id.* at 5.) Given this, we find that the Examiner has sufficiently explained the basis of the rejection and correctly applied the *Alice / Mayo* test. Furthermore, while we agree with Appellant that each claim should be individually examined for subject matter eligibility, we do

not find the Examiner to have improperly judged claims to "automatically stand or fall with similar claims in the application." (Appeal Br. 9 (internal quotation marks omitted.) As an example, while we do not opine on the validity of claims 11 and 31 because they are not on appeal before us, the Examiner has withdrawn the rejection as to these two dependent claims despite finding the independent claims to be directed to patent-ineligible subject matter. (Ans. 3.)

Finally, we are not persuaded by Appellant's argument that the Examiner has not shown that the claimed concept "is similar to at least one concept that the courts have identified as an abstract idea." (Appeal Br. 10.) The Examiner finds that the claims are directed to mathematical relationships, which "have been characterized by the courts as abstract ideas." (Ans. 5.) In particular, we find the facts of this case to be similar to those in *Flook*, in which the Supreme Court invalidated claims directed to a method of updating alarm limits by measuring a process variable, calculating an updated alarm limit, and adjusting the alarm limit to the updated value, where the only difference between the conventional and claimed methods rests in the mathematical algorithm or formula used to calculate the alarm limit. *Flook*, 437 U.S. at 595–86.

The Claims Are Directed to an Abstract Idea

Appellant next contends that the claims are not directed to a patent-ineligible abstract idea. (Appeal Br. 11–13.) Appellant argues that

none of the claims . . . attempt to pre-empt the allegedly . . . abstract idea of "[i]dentifying transition points in a curve reflecting a chemical reaction", as identified by the Office.

Rather, the claims relate to a <u>specific</u> way of identifying at least one transition point of the chemical reaction, thereby proving [sic] for

at least one of a group consisting of controlling the reaction, monitoring the reaction, and analyzing the reaction.

(*Id.* at 12; *see also* Reply 4–8.) Appellant also argues that there are "numerous other ways – which are very different from the novel and inventive way of any one of the pending claims – for '[i]dentifying transition points in a curve reflecting a chemical reaction." (*Id.* at 12–13; *see also* Reply Br. 6.)

We are not persuaded. We note once again that "the absence of complete preemption does not demonstrate patent eligibility." *Ariosa*, 788 F.3d at 1379. Neither does the existence of other methods of identifying transition points in a chemical reaction mean that the claims are directed to patentable subject matter. In *Flook*, for instance, the Supreme Court found claims directed to a method of updating alarm limits to be directed to non-statutory subject matter, despite the fact that there were other, conventional methods of determining alarm limits. *Flook*, 437 U.S. at 585–86 (explaining that "[t]he only difference between the *conventional methods of changing alarm limits* and . . . respondent's application rests in the second step—the mathematical algorithm or formula") (emphasis added).

Appellant argues, however, that recent Federal Circuit cases show that "when a claim recites *a specific way* of accomplishing a desired outcome, as opposed to merely claiming an abstract end, the claim passes through the coarse eligibility filter of 35 U.S.C. §101, and more particularly, through the first step of the framework." (Reply Br. 4 (emphasis original).) Appellant further argues that the Examiner "over-generalized" the claims in characterizing them as directed to "receiving data, calculating function, calculating a difference between the calculated function and received values,

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plotting the data and identifying a transition point," because the claims require

the transition point [to] be identified in a *specific way* that involves, for example, a calculation of a linear function that is parallel to and different from a linear function connecting two of the received values, the two values pertaining to a start and end of a time period, the calculation of a difference between the calculated function and a plurality of the received values pertaining to the time period having the start and end, and the identifying of at least one transition point of the chemical reaction, using the calculated difference, thereby providing for controlling the reaction, monitoring the reaction and/or analyzing the reaction.

(Reply Br. 7 (emphasis original).)

We are not persuaded. The Supreme Court has rejected the notion that "implement[ing] a principle in some specific fashion' will 'automatically fal[1] within the patentable subject matter of § 101." *Alice*, 134 S.Ct. at 2358 (alterations in original) (citation omitted). Appellant essentially argues that the claims are more specific than characterized by the Examiner, because they require a particular mathematical formula (i.e., use of a linear function that is parallel to and different from a linear function connecting two of the received values). However, the claims at issue in *Flook*, which the Supreme Court found to be directed to patent ineligible subject matter, also recited a specific formula for updating alarm limits. *Flook*, 437 U.S. at 596–97 (Appendix to Opinion of the Court).

The Federal Circuit cases cited by Appellant are likewise not applicable to the facts of this case. In *Amdocs*, the specific way in which the claim accomplished a desired outcome required "arguably generic components" to "operate in an unconventional manner to achieve an improvement in computer functionality." *Amdocs (Israel) Limited v. Openet*

Telecom, Inc., 841 F.3d 1288, 1300–1 (Fed. Cir. 2016). Here, the claimed components perform only generic computer tasks of, e.g., calculating a mathematical function and the difference between the function and received values, even if the mathematical function itself is allegedly novel.

Similarly, the rules specified in the claims in *McRO* allowed automation that "goes beyond merely 'organizing [existing] information into a new form" to "produce 'accurate and realistic lip synchronization and facial expressions in animated characters' that previously could only be produced by human animators." *McRO*, 837 F.3d at 1313, 1315.

In contrast, the claims in this case essentially inform a relevant audience of the natural relationship between a linear function having a slope representing a "nearly average rate of the chemical reaction" and transition points in a chemical reaction (i.e., points where the reaction rate "substantially deviates from the nearly average rate of the chemical reaction"). (Spec. 9:30–10:8.) More specifically, while the claims generically recite "identify[ing] at least one transition point . . . thereby proving [sic] for at least one of a group consisting of controlling the reaction, monitoring the reaction, and analyzing the reaction" (Appeal Br. 26, 27–28 (Claims App'x)), the claims provide no *specific* application (e.g., specific types of control, monitoring, or analysis) regarding any transition points identified. Accordingly, we find this case to be similar to *Electric Power Group*, where the Federal Circuit found claims generically directed to gathering, analyzing, and displaying certain types of information to be directed to an abstract idea and explained:

[W]e have treated collection information, including when limited to particular content (which does not change its character as information), as within the realm of abstract ideas. In a similar vein,

we have treated analyzing information by steps people go through in their minds, or by mathematical algorithms without more, as essentially mental processes within the abstract-idea category. And we have recognized that merely presenting the results of abstract processes of collecting and analyzing information, without more (such as identifying a particular tool for presentation), is abstract as an ancillary part of such collection and analysis. Here, the claims are clearly focused on the combination of these abstract-idea processes.

Electric Power Group, LLC v. Alstom S.A., 830 F.3d 1350, 1353–54 (Fed. Cir. 2016).

Claims do not Amount to "Significantly More" than Abstract Idea

Appellant finally contends that, in any event, the claims on appeal amount to significantly more than the alleged abstract idea. (Appeal Br. 14–19; Reply Br. 8–10.) In particular, Appellant argues that the claims on appeal "attempt[] to improve the technical field of chemical reaction technologies," contain "an inventive concept," and encompass only a "particular application" of any alleged abstract idea. (*Id.*)

We are not persuaded. While we agree claims that improve an existing technological process may be patent eligible even if they recite or require a mathematical formula, *Diamond v. Diehr*, 450 U.S. 175, 187 (1981), Appellant provides no persuasive evidence, and only attorney argument, that the claims at issue are directed to an "improvement to the technical field of chemical reaction technologies used for monitoring, controlling, and/or analyzing chemical reactions." (Appeal Br. 15 (emphasis omitted); *see also* Reply Br. 9–10). More specifically, Appellant argues that paragraphs 1–4 of the Specification "describes how its particular arrangement of elements is a technical improvement over prior art' systems." (Reply Br. 10 (citing *Bascomb Global Internet Servs., Inc. v.*

AT&T Mobility LLC, 827 F.3d 1341, 1350 (Fed. Cir. 2016)); see also Appeal Br. 15.) These paragraphs, however, merely describe why it is useful to identify transition points of a chemical reaction. (Spec. 1:4–20.) They do not suggest that the particular arrangement of elements of the claim on appeal constitutes a technical improvement or how such alleged improvement is achieved. Thus, the claims here are unlike those in *Diehr*, which resulted in an improved process for curing synthetic rubber that "significantly lessens the possibility of 'overcuring' or 'undercuring." *Diehr*, 450 U.S. at 187.

We are similarly unpersuaded by Appellant's argument regarding "inventive concept." (Appeal Br. 15–16; Reply Br. 8–9.) Although Appellant argues that the Examiner did not maintain the rejection of the claims as anticipated or obvious, no such rejection is required in order to support a rejection under § 101. Appellant fails to point out how any manipulative steps or corresponding structure in the claims, whether individually or in combination, are not conventional or routine. Methods for identifying transition points (e.g., points of exponential growth) on a graph representing quantitative measurement of a chemical reaction over time are admittedly known in the art. (Spec. 2:29–4:20.) Thus, as in Flook, the only arguably novel feature in the claims is the particular mathematical formula or algorithm for identifying the transition point of a chemical reaction. Accordingly, we find as in Flook that the limitations in the claims on appeal, whether viewed individually or as an ordered combination, are not sufficient to transform the unpatentable abstract idea into a patentable application of the idea.

For reasons already discussed, we are also not persuaded by Appellant's argument that the claims are patentable because they allegedly encompass only a particular application of the abstract idea. *See, e.g., Alice*, 134 S.Ct. at 2358 (rejecting the notion that "implement[ing] a principle in some specific fashion' will 'automatically fal[l] within the patentable subject matter of § 101"") (citation omitted and alterations in original).

Claims 8-10 and 28-30

Appellant argues that claims 8–10 and 28–30 together. (Appeal Br. 20–21.) We take claim 8 as representative. 37 C.F.R. § 41.37(c)(1)(iv). Appellant argues that claim 8 is patent eligible for the same reasons as claim 1, and because claim 8 further comprises "a phase indicator, associated with said transition point identifier, configured to indicate a beginning of a phase of the chemical reaction upon the transition point being identified." (Id.) Appellant argues that "the specific limitations added by the dependent claims . . . confine the alleged to be abstract idea to an even more specific useful application, and further improve the other technical field in an even more specific way." (Id. at 21.) We are not persuaded. The additional limitation merely claims a generic computer configured to inform a relevant audience that a transition point has been identified and thus a phase of a chemical reaction is beginning. As in *Flook*, incorporation of a limitation that provides a potential user feedback, e.g., an alarm, does not render a claim directed to a mathematical formula patentable. Flook, 437 U.S. 584; see also Mayo, 566 U.S. at 79–80 (claim limitation that merely "inform a relevant audience about certain laws of nature" does not render claim patent eligible).

Claims 12 and 32

Appellant argues that claims 12 and 32 together. We take claim 12 as representative. 37 C.F.R. § 41.37(c)(1)(iv). Claim 12 depends from claim 1 and further comprises "a monitoring data generator, associated with said transition point identifier, configured to generate monitoring data based on the identified transition point." (Appeal Br. 27 (Claims App'x).) Appellant argues that, in addition to the arguments presented for claim 1, claim 12 is patent eligible both because the additional limitation confines any abstract idea to a more specific application and improve the technical field in a more specific way, and because claim 12 is "tied to a specific machine with which monitoring data is generated." (Id. at 23.) We are not persuaded for all the reasons already discussed. We also do not find the additional limitation regarding monitoring data generator to add "significantly more" to the abstract idea to which claim 12 is directed, whether individually or in combination with other limitations in the claim. Generating monitoring data relating to a chemical reaction is not novel or unconventional. (Spec. 2:29— 4:20 (describing "traditional methods" of determining time points of exponential growth).) Likewise, the monitoring data generator appears to be a generic computer configured to perform the data generating function. "[M]ere recitation of a generic computer cannot transform a patent-ineligible abstract idea into a patent-eligible invention." Alice, 134 S.Ct. at 2358.

Claims 13 and 33

Appellant argues claims 13 and 33 together. We take claim 13 as representative. 37 C.F.R. § 41.37(c)(1)(iv). Claim 13 depends from claim 1 and further comprises "a photometric measurement device, associated with [the] property value receiver, configured to measure the value of the

physical property." (Appeal Br. 27 (Claims App'x.).) Appellant argues that, in addition to the arguments presented for claim 1, claim 13 is patent eligible both because the additional limitation confines any abstract idea to a more specific application and improve the technical field in a more specific way, and because claim 13 is "tied to a *specific machine* with which the physical property values are measured." (Id. at 23.) We are not persuaded for all the reasons already discussed. We also do not find the additional limitation regarding use of the photometric measurement device to add "significantly more" to the abstract idea to which claim 13 is directed, whether individually or in combination with other limitations in the claim. Using photometric measurement to determine transition points in chemical reactions is not novel or unconventional. (Spec. 2:32–33 ("One traditional method involves an n-derivative of light intensity used to determine time periods of exponential growth."). Furthermore, collecting information, even when limited to particular content, is within the realm of abstract ideas when such collection does not change the information's character as information. Electric Power Group, 830 F.3d at 1353.

SUMMARY

For the reasons above, we affirm the Examiner's decision rejecting claims 1–10, 12–13, 21–30, 32, and 33.

TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

<u>AFFIRMED</u>